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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/728,329	12/04/2003	Daoqiang Lu	P16918	7363

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EXAMINER

AFZALI, SARANG

ART UNIT PAPER NUMBER

3729

DATE MAILED: 07/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/728,329

Applicant(s)

LU ET AL.

Examiner

Sarang Afzali

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 20-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-19, drawn to a method of handling an integrated circuit die, classified in class 29, subclass 831.
 - II. Claims 20-22, drawn to a clip, classified in class 361, subclass 807.
2. Inventions of Group I and Group II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the process as claimed in Group I can be practiced by another materially different apparatus such as picking up an IC die with a clip wherein the clip has no plurality of legs extending downwardly from the main body. Furthermore, the apparatus as claimed in Group II can be used to practice another and materially different process such as picking up an IC die with a clip without using a chuck.
3. A telephone call was made to Nathaniel Levin on 7-05-2005 an election was made without traverse to prosecute the invention of Group I, claims 1-19. Affirmation of this election must be made by applicant in replying to this office action. Claims 20-22 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Specification

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: A METHOD FOR HANDLING INTEGRATED CIRCUIT DIE.

5. The disclosure is objected to because of the following informalities:

Page 4, line 17 of the specification references the clip as item "306". However, earlier in the same paragraph clip is referenced by item "300" and item "306" references the opposed ends of the main body of the clip.

Page 5, line 3 of the specification the term "of the of the clip 300" appears to be incorrect.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-3, 5-10, 12-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Farnworth (US 5,739,050).

As applied to claim 1, Farnworth in disclosing a method for assembling a semiconductor package teaches of a chuck (assembly tool 32 including compression

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arms 80, 82) picking up a clip (bridge clamp 24 with spring 22) and while chuck (32) is holding the clip (24), it picks up the IC die (14) (Figs. 6A-B).

As applied to claim 2, Farnworth teaches the use of vacuum through vacuum conduit (76) to pick up IC die (14, Figs. 6A-B).

As applied to claim 3, the vacuum is applied through the vacuum conduit (76) to the die (14) via an aperture (opening 66) in the clip (24) (Fig. 6B).

As applied to claims 5 and 14, Farnworth teaches that chuck (32) places the clip (24) and the IC die (14) into juxtaposition with heat spreader (20, Fig. 6B). Note that the pressure plate (20) is explicitly taught as being a heat spreader by reference "B", Wood et al. (US 5,519,332), which is incorporated by reference in Farnworth (col. 4, lines 65-67).

As applied to claims 6 and 15, Farnworth further teaches that clip (24) and IC die (14) are released from the chuck (32) while the clip (24) holds the IC die (12) in contact with heat spreader (20, Fig. 6B).

As applied to claims 7 and 16, Farnworth further teaches that IC die (14) is bonded with heat spreader (20, Fig. 6B).

As applied to claims 8 and 17, Farnworth teaches that the clip (32) is removed and disengaged from the clip (24) and heat spreader (20, Fig. 6A).

As applied to claim 9, Farnworth teaches that the chuck (32) by means of vacuum transports the IC die (14) held to the heat spreader (20) by clip (24) before they are bonded (Fig. 6A, col. 5, lines 10-12).

As applied to claim 10, Farnworth teaches that IC die (14) and heat spreader (20) held by clip (24) are transported after they are released by the chuck (32, Fig. 6B).

As applied to claims 12 and 19, Farnworth teaches that chuck (32) simultaneously puts the clip (24) and IC die (14) into juxtaposition with the package substrate (12, Figs. 6A-B).

As applied to claim 13, Farnworth teaches that the apertures in the Chuck (32), clip (24) and heat spreader (20) are all aligned with each other thus allowing the vacuum to be applied through the vacuum conduit (76) to pick up the IC die (14, Figs. 6A-B).

As applied to claim 18, Farnworth teaches that the clip (24) is interposed between the IC die (14) and chuck (32, Fig. 6A).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Farnworth in view of Levert et al. (US 6,407,006). Farnworth discloses all the claimed limitations except about the polymer material. However, Levert et al. in disclosing a method for integrated circuit planarization teach about using a polymer pad (30) under a substrate

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(20) to prevent it from being damaged (Fig. 1, sec. 26, lines 3-6). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Farnworth by using a polymer material for pressure plate (20) as taught by Levert et al. as an effective means to prevent damages to the IC die (14).

10. Claims 5-10, 14-17 are alternatively rejected under 35 U.S.C. 103(a) as being unpatentable over Farnworth in view of Wood et al. (US 5,519,332). In the alternative, if applicant doesn't agree that Farnworth discloses a heat spreader, Wood et al. in teaching about a carrier for testing an unpackaged semiconductor die disclose the following:

As applied to claims 5 and 14, Wood et al. teach that the pressure plate (20) is a heat spreader (col. 6, 11-15). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Farnworth by using the pressure plate (20) as a heat spreader as taught by Wood et al. in providing an effective means for dissipating heat generated by the IC die (14).

As applied to claims 6 and 15, modified Farnworth teaches that clip (24) and IC die (14) are released from the chuck (32) while the clip (24) holds the IC die (12) in contact with heat spreader (20, Fig. 6B).

As applied to claims 7 and 16, modified Farnworth teaches that IC die (14) is bonded with heat spreader (20, Fig. 6B).

As applied to claims 8 and 17, modified Farnworth teaches that the clip (32) is removed and disengaged from the clip (24) and heat spreader (20, Fig. 6A).

As for claim 9, modified Farnworth teaches that the chuck (32) by means of vacuum transports the IC die (14), which is held to the heat spreader (20) by clip (24) before they are bonded (Fig. 6A, col. 5, lines 10-12).

As for claim 10, modified Farnworth teaches that IC die (14) and heat spreader (20) held by clip (24) are transported after they are released by the chuck (32, Fig. 6B).

11. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Farnworth in view of Fitzgerald et al. (US 6,504,723). Farnworth teaches about all limitations of claim 11 except about reflowing a solder layer to bond the heat spreader (20) to the IC die (14). However, Fitzgerald et al. in disclosing an electronic assembly teach about a heat spreader (30) bonded by solder material (16) to an IC die (14) to dissipate the generated heat away from the IC and maintaining functional integrity of the integrated circuit (col. 1, lines 20-25). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Farnworth by using the teaching of Fitzgerald et al. to provide an effective means of bonding the IC die to the heat spreader to reduce or eliminate thermal stresses in the IC die.

12. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Farnworth in view of Wood et al. and further in view of Fitzgerald et al. Applicant is referred to the explanation as cited in paragraph # 11 above.

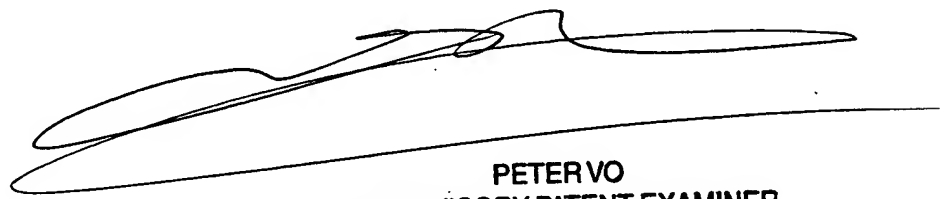
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sarang Afzali whose telephone number is 571-272-8412. The examiner can normally be reached on 7:00-3:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on 571-272-4690. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

S.A.
07/26/2005



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